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LHC Scrubbing Runs

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To achieve its nominal performances, the LHC relies on the scrubbing runs to both improve the dynamic vacuum (beam lifetime) by a vacuum cleaning effect and decrease the electron cloud induced limitations (heat load and beam instabilities) by a beam conditioning effect.

An optimum scrubbing run scenario will be presented based on the vacuum cleaning and beam conditioning results in the SPS together with their applicability to the LHC and in particular for the role played by the physisorbed gasses and the magnetic fields.

The interdependence of the scrubbing run scenario with the beam parameters used during the first 3 years of operation will be presented and the limitations discussed, in particular the advantages and drawbacks of scrubbing runs at injection energy. The implications of the deconditioning effect observed when the machine is not operated with beams will be presented together with the consequences of a partial warming up of the cold parts during the shutdown.

To follow the evolution of the vacuum cleaning and beam conditioning during the scrubbing runs, diagnostics are foreseen in the RT and Cold vacuum pilot sectors in IR4. These diagnostics will be specifically design and operated to provide information on the beam conditioning levels of the RT and colds sections of the LHC.

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